--24. The thin-film transistor according to Claim 19, wherein said crystallization process being laser annealing on a semiconductor film so as to form said channel region.--

REMARKS

Claims 1-24 are pending in this application. By this Amendment claims 1-2 and 7-13 are amended, and claims 15-24 are added. Reconsideration in view of the above amendments and following remarks is respectfully requested.

The attached Appendix includes marked-up copies of each rewritten claim (37 C.F.R. §1.121(c)(1)(ii)).

OBJECTIONS

The Office Action objects to the title of the invention as not being descriptive. In response, Applicants amend the title to be more descriptive. Accordingly, Applicants respectfully request that the objection be withdrawn.

The Office Action objects to claims 2 and 7-13 for minor informalities. Applicants amend the claims to correct the minor informalities. Accordingly, Applicants respectfully request that the objection be withdrawn.

CLAIM REJECTIONS

The Office Action rejects claims 1-4, 6, 7 and 14 under 35 U.S.C. §102(b) as being anticipated by Blake (U.S. Patent No. 4,965,213); claims 1-3, 5 and 8 are rejected under 35 U.S.C. §102(e) as being anticipated by Gardner et al. (U.S. Patent No. 6,005,285); claims 9-10 are rejected under 35 U.S.C. §103(a) as being unpatentable over Gardner; and claims 11-12 are rejected under 35 U.S.C. §103(a) as being unpatentable over Blake. Applicants respectfully traverse the rejections.

In particular, Applicants respectfully assert that neither Blake nor Gardner disclose or suggest a method of manufacturing a thin-film transistor, including at least forming a

recombination center by introducing an impurity into a channel region so that a distance between the recombination center and a drain region is shorter than a distance between the recombination center and a source region, as recited in independent claim 1.

Moreover, both Blake and Gardner fail to disclose a method of manufacturing a display device including a thin-film transistor that is manufactured by at least forming a recombination center that captures carriers in a channel region by introducing an impurity into the channel region, as recited in independent claim 14.

Specifically, Blake discloses a light doped region 38 for supporting a p+ contact region 30 and for forming a contact between the source and the body to decrease leakage in the source-drain during ion radiation. See col. 4, lines 53-60; col. 5, lines 44-47 and lines 64-68. The formed position is located at a part of the boundary of the source region so that the distance to the source region is shorter than the distance to the drain region. See generally Figure 4.

Gardner discloses a punch-through stop 26 formed in the channel region by doping Boron. See col. 8, lines 21-57. The punch-through stop in Gardner is formed to prevent a depletion layer extended from the drain from reaching the source by doping the same type of impurity as the channel. However, the recombination center is formed to prevent the Kink effect by doping impurity different from the dopant. Moreover, Gardner teaches the formation of the punch-through stop at equal distances to the source 32a and drain 32b. See generally Figure 6.

Therefore, both Blake and Gardner fail to disclose a method of manufacturing a thin-film transistor including at least forming a recombination center by introducing an impurity into the channel region so that a distance between the recombination center and the drain region is shorter than a distance between the recombination center and the source region. Further, Blake fails to disclose or suggest forming a recombination center that captures

carriers in the channel region by introducing an impurity into the channel region. Furthermore, Blake and Gardner fail to disclose a recombination center so that a distance between the recombination center and the drain region is shorter than a distance between the recombination center and the source region.

Accordingly, because neither Blake nor Gardner disclose each and every feature as the claimed invention, Applicants assert that independent claims 1 and 14 define patentable subject matter. Claims 2-13 depend from independent claim 1, and therefore, also define patentable subject matter. Accordingly, Applicants respectfully request that the rejections under 35 U.S.C. §102 and 35 U.S.C. §103(a) be withdrawn.

In view of the foregoing amendments and remarks, Applicants submit that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1 - 24 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number listed below.

Respectfully submitted,

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Date: August 2, 2002

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APPENDIX

Changes to Title:

The following is a marked-up version of the amended title:

METHOD FOR MANUFACTURING A THIN-FILM TRANSISTOR COMPRISING A RECOMBINATION CENTER

Changes to Claims:

Claims 15-24 are added.

The following is a marked-up version of the amended claims:

1. (Twice Amended) A method of manufacturing a thin-film transistor, comprising:

forming a channel region facing a gate electrode through a gate insulating film;

forming source and drain regions connected to the channel region in a semiconductor film that is formed on a surface of an insulating substrate; and

forming a recombination center ~~that captures carriers in the channel region~~ by introducing an impurity into ~~said~~ the channel region so that a distance between the recombination center and the drain region is shorter than a distance between the recombination center and the source region.

2. (Twice Amended) The method of manufacturing a thin-film transistor according to Claim 1, wherein said impurity being at least one kind selected from the group including inert gases, metals, Group III elements, Group IV elements and Group V elements.

7. (Three Times Amended) The method of manufacturing a thin-film transistor according to Claim 3, wherein an average projected range of the impurity in said process of introducing an impurity being from a center in a direction of thickness of said channel region to an interface between the channel region and the gate insulating film.

8. (Three Times Amended) The method of manufacturing a thin-film transistor according to Claim 3, wherein an average projected range of the impurity in said process of introducing an impurity being from a center in a direction of thickness of said channel region to an interface between the channel region and a layer located on said substrate side.

9. (Twice Amended) The method of manufacturing a thin-film transistor according to Claim 1, wherein a process of introducing said impurity to said channel region being carried out by impurity diffusion from an impurity diffusion source arranged at a lower layer side of said channel region.

10. (Twice Amended) The method of manufacturing a thin-film transistor according to Claim 9, wherein said impurity diffusion being carried out in a crystallization process on a semiconductor film so as to form said channel region.

11. (Three Times Amended) The method of manufacturing a thin-film transistor according to Claim 4, wherein said crystallization process being laser annealing on a semiconductor film so as to form said channel region.

12. (Three Times Amended) The method of manufacturing a thin-film transistor according to Claim 1, wherein each process carried out after introducing said impurities to said channel region being carried out at a temperature below 400°C.

13. (Three Times Amended) The method of manufacturing a thin-film transistor according Claim 1, wherein each process carried out after introducing said impurities to said channel region being carried out at a temperature below 300°C.